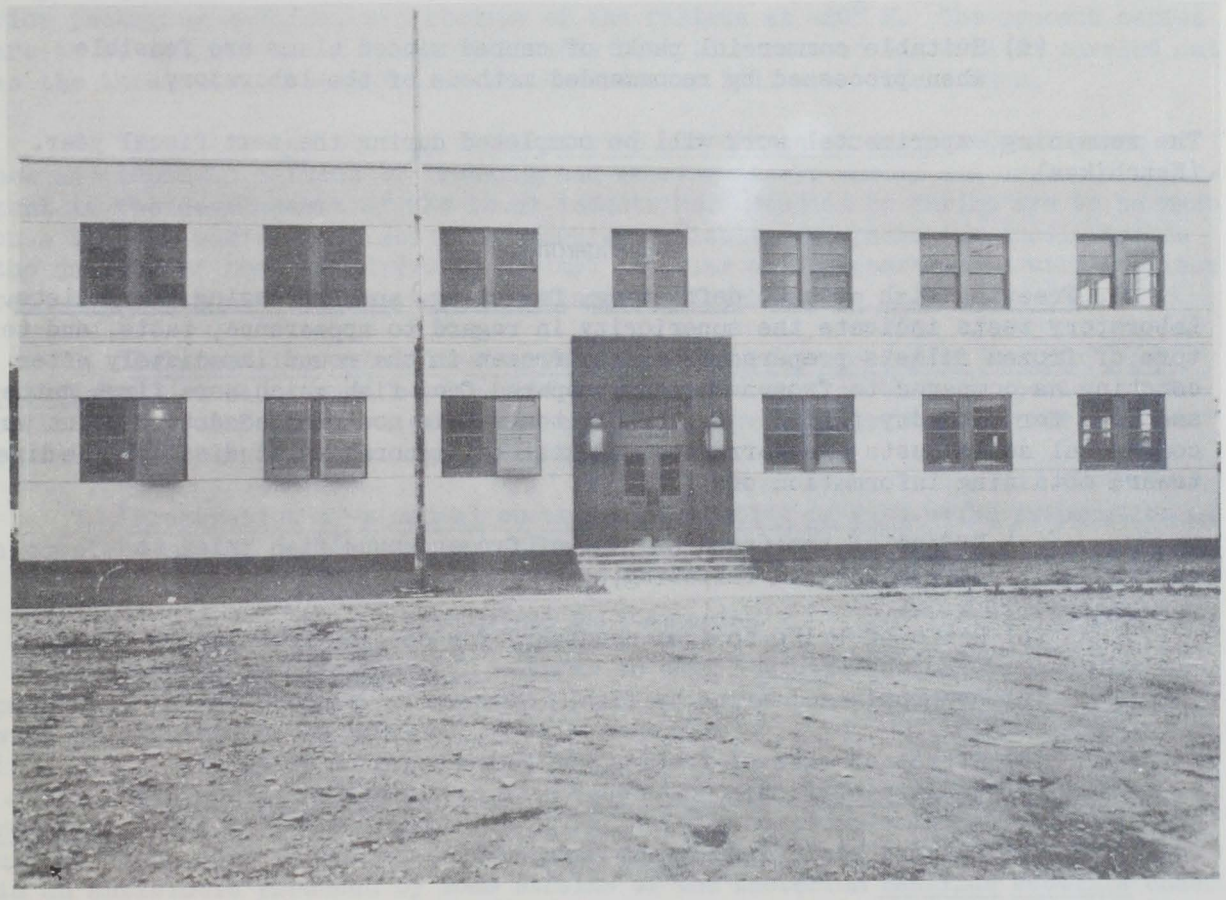
FISHERY TECHNOLOGICAL RESEARCH PROGRAM, 1950-51

Nutrition

1. *Effect of low and high temperatures on chemical properties of proteins.--An investigation will be made into the way in which water is bound to protein. When fish is frozen the first change is separation of the water from the protein. Upon thawing there is the question of whether the water returns to its original relationship to protein. The study will include some preliminary work on isolation and identification of fish proteins and possibly a study of some of their properties and reactions, such as, isoelectric point, heat denaturation, etc. These investigations might lead to important advances toward an understanding of the nature and control of drip, possibly information on the toughening of fish in cold storage, etc., and would also be of importance to drying of fish, such as fish meal, and dehydration of fish. (Seattle)

2. Utilization of salmon cannery waste for hatchery food.--Work of the preceding year was concerned with:

(a) Collaborative work with other State and Federal agencies in the analysis of mixed diets and special diet components for chemical proximate analyses and vitamin content;



FISHERY PRODUCTS LABORATORY IN KETCHIKAN, ALASKA. OPERATED JOINTLY BY THE FISH AND WILDLIFE SERVICE AND THE FISHERIES EXPERIMENTAL COMMISSION OF ALASKA.

* NEW PROJECT.

(b) Collection of raw material such as hake and other fish for hatchery feeding tests; and

(c) Preservation and processing of raw material, particularly tests on salmon eggs at relatively low temperatures using various chemical preservatives and antioxidants.

In view of the promising results in feeding tests with salmon eggs, the studies will be continued with special emphasis on completing the work on the preservation of salmon eggs. Suitable methods of preserving salmon eggs for hatchery food would allow the tapping of a considerable portion of the Alaska resources, now commonly wasted, and which totals in excess of 8,500,000 pounds annually. (Seattle)

3. Clam processing methods and clam toxicity survey.--Tests indicate in part:

(a) That toxin is present in butter clams of Alaska from certain areas during every month;

(b) The siphons are several times greater in toxicity than are the bodies of the clams;

(c) Rate of toxin loss in highly toxic clams transplanted into a relatively non-toxic beach is very low; and

(d) Suitable commercial packs of canned minced clams are feasible when processed by recommended methods of the laboratory.

The remaining experimental work will be completed during the next fiscal year. (Ketchikan)

Refrigeration

1. Freezing fish at sea, defrosting, filleting, and refreezing the fillets.--Laboratory tests indicate the superiority in regard to appearance, taste, and texture of frozen fillets prepared from fish frozen in the round immediately after catching as compared to frozen fillets prepared from fish which were first gutted and iced for a 10-day period. Laboratory tests have now proceeded to a point where commercial scale tests are warranted. Additional laboratory studies will be directed toward obtaining information on:

(a) Effect of prolonged storage of frozen round fish prior to defrosting and filleting;

(b) Ratio of brine to fish necessary for optimum freezing;

(c) Absorption of brine by fish;

(d) Effect of rate of freezing or temperature of brine on quality of fish;

(e) Viscera yield from round fish; and

(f) Thawing methods. (Boston)

2. Study of fresh and frozen oysters.--This project is being continued and was initiated with a view toward developing and improving methods of freezing, packaging, storing, and testing oysters. These studies include, specifically:

(a) pH determinations of fresh and frozen shucked oysters;

(b) Prevention of discoloration in frozen oysters; and

(c) Packaging of frozen oysters. (College Park)

3. Studies of methods of handling frozen salmon to be used for canning.--Processing difficulties have developed and some commercial canned packs prepared from frozen salmon were of inferior quality. The practice of preparing packs from frozen fish is being adopted in certain instances by various processors where the fish is caught and frozen in remote areas and canned at existing canneries elsewhere. Experimental studies on frozen red (sockeye) salmon indicated that the flavor and texture of the canned red salmon prepared from the frozen fish was significantly adversely altered in comparison with the red salmon canned from fresh fish of the same lot. Additional studies will be made on the effect of storage temperature and freezing variables on the quality of the final canned product. (Ketchikan)

4. Freezing pink salmon.--Freezing tests to date indicate the improvement in keeping quality of frozen pink salmon fillets due to ascorbic acid treatment, superior packaging methods, and storage of the fillets at -20° F. The present series are to be completed. A commercial scale test is warranted and will be carried out as the interest and cooperation of the industry indicate. (Ketchikan)

5. *Freezing and storing Alaska shrimp and dungeness crabs.--Development of new and improved methods of freezing and storing Alaska shrimp and crabs is important in the development of the local industries. Studies on shrimp are to be made on a limited basis on effect of precooking variables and packaging conditions on the quality of the stored frozen shrimp. Studies on dungeness crabs will consider packaging methods with new type containers. (Ketchikan)

6. *Palatability and cold storage life of various species of Pacific Coast rockfishes.--A study will be directed to determine whether certain species of Pacific Coast rockfishes are of sufficiently superior quality to the other species to warrant separate marketing. (Seattle)

7. *Preparation of a manual on the refrigeration of fish.--The preparation of a complete manual on the refrigeration of fish has been authorized.

Processing and Preservation

1. Canning of "little tuna."--Packs to date indicate that it is possible to prepare a canned product of commercial quality. The present experimental tests will be carried out to completion. (College Park)

2. *Evaluation of the antibiotic "subtilin" as a preservative for fishery products.--Tests by the Department of Agriculture showed promising results in the use of "subtilin" in the preservation of canned fruits and vegetables. Subtilin is an antibiotic produced by some strains of the bacterium Bacillus subtilis under proper culturing conditions. Its experimental use as a preservative in certain canned food products allows shorter processes resulting in a quality product of

*NEW PROJECT.

better appearance and taste than those prepared by the normal processing methods. Attempts will be made to apply subtilin to the preservation of certain fishery products. (Boston, College Park, and Seattle)

Sanitation and Bacteriology

1. A bacteriological survey of the preparation of crab meat.--Limited studies begun during the last year are to be supplemented with further work to establish recommended practices for the handling of highly perishable crab meat, making use of such data on the subject as have already been collected by laboratory personnel. (College Park)

2. *Growth of pink yeast (isolated from oysters) at below freezing temperatures.--A "pink" yeast was isolated from an active culture found on oysters stored at 0° F. Further studies are to be carried out on the cultural characteristics and the physiology of the organism with a view toward its control in the oyster industry. (College Park)

Analysis and Composition

1. *Chemical composition of fish, (A) Menhaden.--Complete analyses are to be made of certain fish, beginning with menhaden, for chemical proximate analyses, proteins and protein degradation products, vitamins, and biologically active compounds with a view towards determining the over-all potential commercial value of the fish. (College Park)

2. Cooperative work with the Association of Official Agricultural Chemists on the determination of oil in fish meal.--Further tests on the improvement of methods for the determination of oil in fish meal are to be conducted in the light of knowledge gained on earlier tests and to pursue newer ideas on the subject. The present methods are inadequate and give results as much as 20 percent of true value. Accurate testing methods are necessary to avoid confusion between buyer and seller of fish meal. (Seattle)

Byproducts

1. *Vitamin content, particularly animal protein factor and vitamin B_{12} of fishery byproducts.--Analysis and feeding tests are to be conducted on fishery byproducts (fish meal and solubles) to determine the potential value of the products in animal and poultry feeding. (College Park and Seattle)

2. Utilization of salmon cannery waste for animal food--Cooperative tests with the Petersburg, Alaska, experimental fur farm.--Work will be continued on collecting analyzing, and processing salmon waste in connection with cooperative studies with the U.S. D.A., Petersburg, Alaska fur farm, on use of salmon waste as feed for fur farm animals. (Ketchikan)

3. *Preparation of a manual on the fish meal and oil industry.--The preparation of a complete manual on the fish meal and oil industry has been authorized.

* * * * *

In addition to the above projects, several carried over from the preceding year will be written up and reports completed during the first and second quarter of this fiscal year. These include:

* NEW PROJECT.

1. Determination of food value of fishery products as prepared for serving.

2. Correlation of biological and spectrophotometric methods for the determination of vitamin A potencies.

3. Effect of fluctuating temperatures on quality of frozen fish in storage and in transit.

4. Frozen storage of certain Pacific Coast fish, second report.

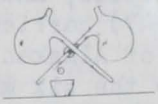
INFORMATION ON PROGRESS OF TECHNOLOGICAL PROJECTS

Current information regarding the progress on the various projects is presented in Commercial Fisheries Review (CFR) in the section "Research in Service Laboratories."

More detailed information on the projects may be obtained by the fishery and allied industries by writing directly to the Branch of Commercial Fisheries, Fish and Wildlife Service, Washington 25, D. C.; to the laboratories;[1] or by consulting with members of the Technological Section. Phase or final reports on projects are usually published in Commercial Fisheries Review, as fishery leaflets (FL) or scientific reports, or in non-governmental scientific journals. Abstracts of these and other current information pertaining to commercial fisheries are available in Commercial Fisheries Abstracts (CFA).

CFR, CFA, FL, and most scientific reports are available free to members of the fishery and allied industries on request. Some of the special scientific reports are sold by the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

1/SEE INSIDE BACK COVER OF THIS ISSUE FOR ADDRESSES OF LABORATORIES.



PACKAGING FROZEN FISHERY PRODUCTS

The requirements for satisfactory containers for frozen fishery products are no less rigid than for other frozen products. The choice of the package is very important in protecting and merchandising the product. The problem of vital importance is that of preventing loss of moisture from the product. The use of packaging materials having low water-vapor transmission rates must be emphasized. A package made of suitable water-vaporproof materials which will satisfactorily withstand low storage temperatures without becoming brittle or otherwise unsatisfactory and which is tightly sealed, will provide adequate protection for a long period of frozen storage.

--Fishery Leaflet 324